

## PATENT ABSTRACTS OF JAPAN

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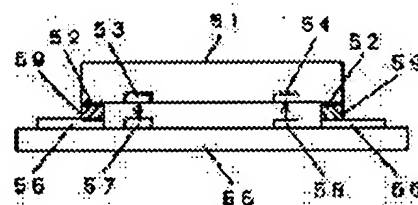
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### (54) ELECTRONIC COMPONENT AND MOUNTING STRUCTURE THEREOF

#### (57)Abstract:

PURPOSE: To provide an electronic component which can be mounted easily at a high density and also provide a mounting structure thereof.

CONSTITUTION: At a lower surface of an electronic component 51, an electrode for earth 52, a light emitting device 53, and a photo detector 54 are installed. On an upper surface of a substrate 55, an electrode for earth 56, a photo detector 57, and a light emitting device 58 are installed. The electrode 52 of the electronic component 51 is bonded bond 59 to the electrode 56 of the substrate 55. Under such a condition, the light emitting device 53 and the photo detector 54 of the electronic component 51 are located face to face with the photo detector 57 and the light emitting device 58 of the substrate 55 with a space formed between them and therefore optical signals can be exchanged between them. Since the electronic component 51 requires no lead extending outwards, a mounting area is small and a high density mounting is possible. At the same time, a frequency response is good and repair can be made easily.



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the mounting structure of the electronic parts and electronic parts which access a signal by the optical element between the substrates with which electronic parts and these electronic parts were mounted.

[0002]

[Description of the Prior Art] There are various forms in electronic parts and it is mounted in a substrate by various approaches. Hereafter, conventional electronic parts and its mounting structure are explained.

[0003] Drawing 5 (a), (b), (c), and (d) are mounting structural drawings of the conventional electronic parts. (a) is mold chip mounting, electronic parts 11 carry a chip 13 on the land 12 of a leadframe, form the mold object 14 which protects a chip 13, and are constituted, and much leads 15 have extended from the mold object 14 to the method of outside. Moreover, the electrode 17 is formed in the top face of a substrate 16. These electronic parts 11 are mounted in a substrate 16 by using lead 15 as the electrode 17 of a substrate 16 soldering 18.

[0004] (b) is bare chip mounting, has pasted up the bare chip 21 on the top face of a substrate 23 with bond 22, and has pasted up the electrode of the top face of a bare chip 21, and the electrode of a substrate 23 with the wire 24. Moreover, in order to protect a wire 24, the closure of the bare chip 21 is carried out with synthetic resin 25.

[0005] (c) is TAB (Tape Automated Bonding) mounting and bonding of the bare chip 31 is carried out to the lead 33 formed in the tape carrier package 32. It is mounted by pasting up the lead 33 of a tape carrier package 32 on the electrode of a substrate 34.

[0006] (d) is flip chip bonding. The bump (protrusion electrode) 42 is formed in the inferior surface of tongue of a flip chip 41, the electrode 44 of a substrate 43 is made to ground a bump 42, and bonding is carried out with bond 44.

[0007]

[Problem(s) to be Solved by the Invention] As mentioned above, although there were various things in electronic parts or its mounting structure, there was a trouble described below, respectively. That is, since the lead 15 which extends from the mold object 14 and the mold object 14 to the method of outside is required for what is shown in (a), a component-side product becomes quite large and is disadvantageous on high density assembly. Moreover, the number of lead 15 increases in recent years, and since the lead pitch is formed into a \*\* pitch, a high mounting precision is required. For this reason, high-speed mounting by mounting equipment is difficult. Moreover, frequency-response nature is also a little bad.

[0008] Moreover, the examination of products of the bare chip 21 before mounting is difficult for what is shown in (b). Moreover, since the synthetic resin 25 which closes a bare chip 21 is applied although it must repair (remove a bare chip 21 from a substrate 23, and mount again) when poor mounting becomes clear in the examination of products after mounting, repair is difficult.

[0009] What is shown in (c) has expensive mounting equipment, and, moreover, its a mounting rate is slow. Moreover, since electronic parts are expensive, cost is very high, and since it is hard to remove lead 33 from a substrate 34, repair is difficult. Moreover, what is shown in (d) has a bump's high manufacturing cost, and an examination of products and repair are difficult for it. There were various troubles in conventional electronic parts and its mounting structure as mentioned above.

[0010] Then, this invention cancels the above-mentioned conventional trouble, and it aims at offering the mounting structure of the electronic parts and electronic parts which can be easily mounted in a substrate.

[0011]

[Means for Solving the Problem] For this reason, this invention prepared the electrode for a ground, and the optical element for signaling accesses in the inferior surface of tongue, and constituted electronic parts. Moreover, the electronic parts which prepared the electrode for a ground and the optical element for signaling accesses in the inferior surface of tongue, and the substrate which prepared the electrode for a ground and the optical element for signaling accesses in the top face are constituted, and the electrode of electronic parts is pasted up with conductive bond on the electrode of a substrate, and set the optical element of electronic parts, and the optical element of a substrate, spacing is made to counter, and it is made to mount it in the condition.

[0012]

[Function] According to the above-mentioned configuration, electronic parts can be easily mounted in a substrate. Moreover, since a component-side product is small, high density assembly is possible for it, and it is excellent also in frequency-response nature by accessing a signal optically by the optical element further.

[0013]

[Example] Next, the example of this invention is explained, referring to a drawing. Drawing 1 is the electronic parts of the first example of this invention, and the perspective view of a substrate, and drawing 2 is mounting structural drawing of these electronic parts. In drawing 1, 51 is electronic parts and the electrode 52 for a ground is formed in the corner of the inferior surface of tongue. Moreover, the light emitting device 53 and the photo detector 54 are formed in the inferior surface of tongue. The light emitting device 53 of this example is LED.

[0014] The electrode 56, the photo detector 57, and light emitting device 58 for a ground are prepared in the top face of a substrate 55. The electrode 56, the photo detector 57, and light emitting device 58 of a substrate 55 are prepared in the location which counters the electrode 52, the light emitting device 53, and photo detector 54 of electronic parts 51.

[0015] Drawing 2 shows the condition of having mounted electronic parts 51 in the substrate 55. The electrode 56 of a substrate 55 is pasted with the conductive bond 59, and the electrode 52 of electronic parts 51 is grounded to it. As this bond 59, they are solder, conductive resin, etc. In this condition, the light emitting device 53 and photo detector 54 of electronic parts 51 set spacing to the photo detector 57 and light emitting device 58 of a substrate 55, have countered them, and can access a signal optically. That is, light emitting devices 53 and 58 and photo detectors 54 and 57 are optical elements for signaling accesses.

[0016] Since according to the mounting structure of these electronic parts the lead which extends from electronic parts 51 to the method of outside does not exist but a signal is accessed by the light emitting device 53 of the inferior surface of tongue of electronic parts 51 and the photo detector 54, and the photo detector 57 and light emitting device 58 of a substrate 55 that counter these as shown in drawing 2, the component-side product of electronic parts can be made small. Moreover, since a signal is accessed by the optical element, frequency-response nature is also good, and by making light emitting devices 53 and 58 turn on, the examination of products after mounting can also be conducted easily, and can be easily conducted only by repair of the case of poor mounting removing bond 59 further.

[0017] Drawing 3 is mounting structural drawing of the electronic parts of the second example of this invention, and drawing 4 is a signal output Fig. for homotopic doubling. Electronic parts 51 are the same as the first example shown in drawing 1. In drawing 3, bonding of the electrode 52 of electronic parts

51 is carried out to the electrode 56 of a substrate 55 from that of the conductive bond 60. This bond 60 mixes a conductive metal powder in an epoxy resin.

[0018] 61 is a fixture for alignment and consists of the \*\*\*\* 63 screwed in at a level with the carrier implement 62 and this carrier implement 62. Bond 60 measures the signal intensity which light emitting devices 53 and 58 are made to emit light, and photo detectors 54 and 57 receive in the state of un-hardening. In drawing 4, the light emitting device 53 of electronic parts 51 and a photo detector 54, and the photo detector 57 and light emitting device 58 of a substrate 55 counter [ the condition of the peak P of a signal ] completely, and it is a time of a location gap of electronic parts 51 being 0. Therefore, by \*\*\*\*ing and pressing 63 against the side face of electronic parts 51, electronic parts 51 are made to move slightly horizontally, signal intensity is measured, and where the peak P of a signal is acquired, a location gap is set to 0. Although it \*\*\*\*s from the direction of on either side, and 63 is pressed against the top face of electronic parts 51 and carried out in drawing 3, electronic parts 51 are squares as shown in drawing 1, therefore they are \*\*\*\*ed from four directions to the 4th page of electronic parts 51, press 63, and cancel a location gap of electronic parts 51.

[0019] Thus, mounting will be completed, if electronic parts 51 are carried in a substrate 55 and heat curing of the bond 60 will be heated and carried out at a heater (outside of drawing). The same operation effectiveness as the first example is not only acquired, but this second example can cancel a location gap of electronic parts 51 easily with a fixture 61.

[0020]

[Effect of the Invention] According to this invention, the following effectiveness is acquired. That is, since the lead which extends from (1) electronic parts to the method of outside does not exist, it can make a component-side product small, and the high density assembly of it becomes possible. (2) Although automatic loading of the electronic parts is carried out by mounting equipment at a substrate, even if the optical element by the side of electronic parts and the optical element by the side of a substrate are carrying out the location gap for some, since access of a signal is possible, it does not necessarily need to be high, therefore high-speed mounting of packaging density by mounting equipment is attained. (3) Since a signal is accessed by the optical element, frequency-response nature is good. (4) By energizing to an optical element, the quality of packaging density can be judged easily. (5) It can repair easily. (6) As shown by the second example, a location gap is easily cancelable with a fixture.

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CLAIMS

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[Claim(s)]

[Claim 1] Electronic parts characterized by preparing the electrode for a ground, and the optical element for signaling accesses in an inferior surface of tongue.

[Claim 2] Mounting structure of the electronic parts characterized by there being electronic parts which prepared the electrode for a ground and the optical element for signaling accesses in the inferior surface of tongue, and a substrate which prepared the electrode for a ground and the optical element for signaling accesses in the top face, and pasting up the electrode of said electronic parts with conductive bond on the electrode of said substrate, setting the optical element of said electronic parts, and the optical element of said substrate, and making spacing counter in the condition.

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[Translation done.]

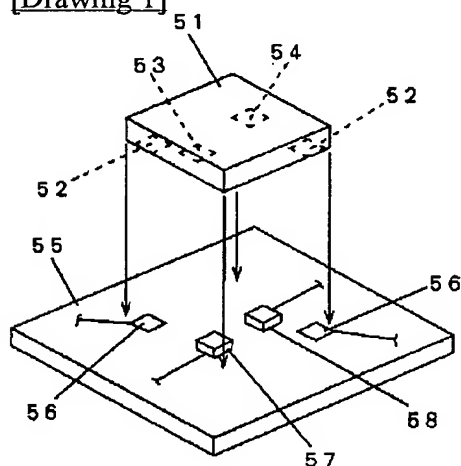
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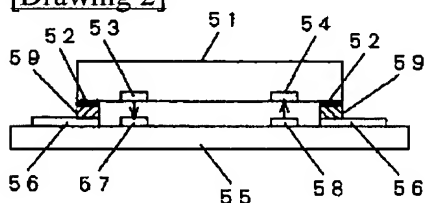
## DRAWINGS

[Drawing 1]



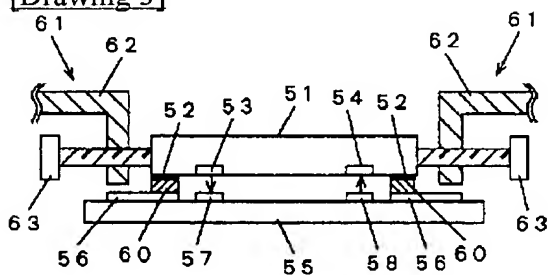
- 51 電子部品  
52, 56 アース用の電極  
53, 58 発光素子  
54, 57 受光素子  
55 基板

[Drawing 2]



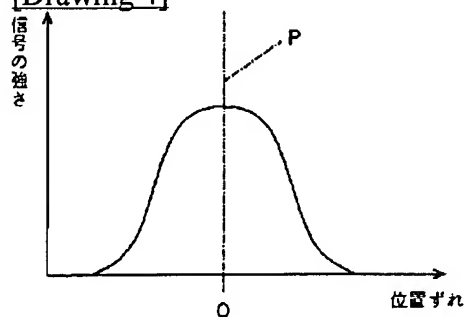
59 ボンド

[Drawing 3]

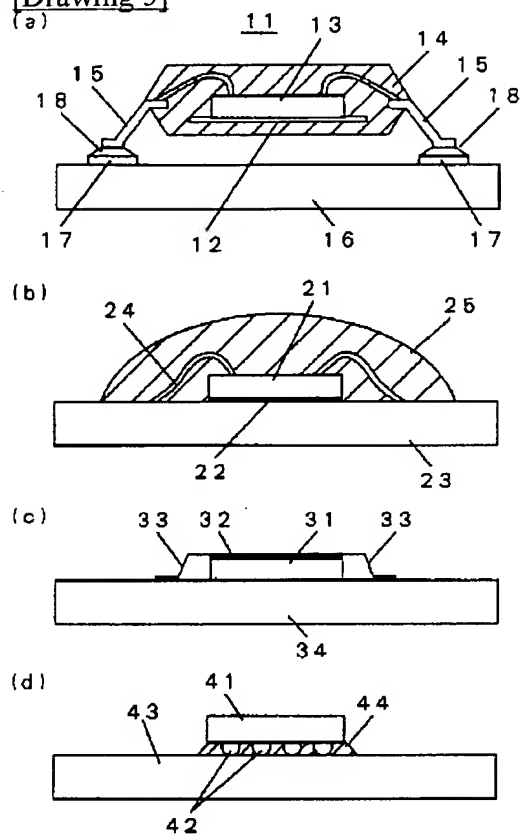


60 ボンド

[Drawing 4]



[Drawing 5]



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